

**EXHIBIT B**  
**INVENTION SUBMISSION FORM**

Answer all questions below as completely and accurately as possible. Please assume that the recipient has a basic understanding of telecommunication technology in general, but is not a specialist in your field. This information is required in order that the Intellectual Property Law Organization attorney can consider the merit of your proposal and determine the extent of its commercial importance.

1. What is the problem you are trying to solve? In your answer, please start with a general description of the subject area and progress from there to the specific technical issues.

We are trying to solve the problem of degrading throughput performance in high-speed downlink shared channels that employ link adaptation. When the environment that allows link adaptation to function changes the quality metrics of the UE can be far from the desired (target) values.

2. Explain your solution. Attach any sketches, lab notebook entries, TMs, etc. which help describe and illustrate the solution. Please include any references cited.

The Quality Control Loop (QCL) solution is described in the attached draft Technical Memorandum. It simply changes the thresholds based on which the Modulation and Coding Scheme is selected in every Transmission Time Interval (TTI).

3. Compare your solution to those in the prior art, describing significant structural/functional differences. It is also helpful if you can identify deficiencies of the prior art that are overcome by your solution.

Known algorithms that addressed the same problem have been published in VTC 2001 and as 3GPP contributions from competitors. These are:

- [1] Clive Tang, "An intelligent Learning Scheme for Adaptive Modulation", Nokia Research Center, VTC 2001, <http://ieeexplore.ieee.org/iel5/7588/20688/00956573.pdf?isNumber=20688>
- [2] NEC and Telecom Modus joint contribution to 3GPP RAN1 May 2001, "Selection of MCS levels in HSDPA", [http://felix1.de.lucent.com/3GPP/RAN/RAN\\_Tdocs2001/R1-01-0589.zip](http://felix1.de.lucent.com/3GPP/RAN/RAN_Tdocs2001/R1-01-0589.zip)
- [3] NEC and Telecom Modus joint contribution to 3GPP RAN1 June 2001, "Simulation Results on HSDPA Link Adaptation with Threshold Adjustment", [http://felix1.de.lucent.com/3GPP/RAN/RAN\\_Tdocs2001/R1-01-0747.zip](http://felix1.de.lucent.com/3GPP/RAN/RAN_Tdocs2001/R1-01-0747.zip)
- [4] Motorola contribution to 3GPP RAN1 August 2001, "Simulation results on HSDPA link adaptation", [http://felix1.de.lucent.com/3GPP/RAN/RAN\\_Tdocs2001/R1-01-0936.zip](http://felix1.de.lucent.com/3GPP/RAN/RAN_Tdocs2001/R1-01-0936.zip)

NOTE: The problem of optimal selection/control of thresholds is a very important one. Qualcomm must have IPR in the area under for the use in 1x EV DO (HDR) system. The so-called "Predictor" that equipped Lucent with after the agreement is implemented by their ASICs at the User Equipment side i.e. it is a mobile terminal algorithm since the MCS selection is done by the terminal. In the case of UMTS though, it is the channel quality that is being fed back (pending approval in 3GPP) and therefore QCL is a Node-B algorithm i.e. it will be incorporated in our ASICs/UCU (Universal CDMA Unit).

4. Furnish a hard-copy of a patent or publication describing the closest prior art, that you know of, to your solution.

5. State any unique benefits achieved by your solution; i.e., performance, utility, durability, cost, etc.

The solution is unique and extremely simple as it is based on CRC checks. The QCL every TTI updates a histogram of previously chosen MCSs and considers these probabilities along with the current CRC event to adjust the thresholds. The solution is very robust i.e. it performs well under a variety of environments and mobility conditions.

6. Names, location, and telephone numbers of all inventors. And state the contribution each inventor made towards the invention. Note that a person is not an inventor merely because he/she was a part of a project team, a project supervisor, etc.

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7. Plans for publication or disclosure to others not under a Non-Disclosure Agreement with Lucent:

\_\_\_\_\_ None  
\_\_\_\_\_ Uncertain  
\_\_\_\_\_ To be published (date) \_\_\_\_\_ in \_\_\_\_\_

We are considering the publication of the invention to 3GPP and to a Communication Letters.  
The 3GPP publication may be as soon as November 19<sup>th</sup>.

8. Please answer the following:

Will the invention be used in or proposed for use in an actual or defacto standard?

Yes, will be used in UMTS (3GPP).

Does the invention have a user feature of a present or imminent Lucent commercial service or product offering which no equally good alternative exists in the marketplace?

Yes, the invention can be used both at the Node-B (OneBTS) and the terminal side (licensing) .

Is the invention a processing or commodity product type, e.g., IC processing, generic chip architecture, fiber/cable structure, for which the industry has historically wound up using only one or two approaches, and this invention might ultimately prove to be one of those?

The invention is as significant for the shared packet channel operation as Outer Power Control Loop is for dedicated (circuit switched) channels. For the later the industry have been using an algorithm that Qualcomm invented in the early 90s. For shared channels this invention provides an opportunity for Lucent to either add value to its products (proprietary solution) or obtain revenues from the licensing if this solution is adopted by 3GPP.

Is there actual or imminent use of the invention by others?

Yes.

Will the invention be licensed?

The invention can be licensed to HSDPA, HDR or 1x EV/DV base station and/or terminal manufacturers.

Is the invention a communication signal format, protocol or coding invention with some likelihood of use by others?

Is the invention a type of service or visible service feature?

No.

Are there few equally advantageous alternatives to the invention, and the invention would appear in product documentation or is a user feature?

Is there a demonstrated history of others following Lucent's lead with respect to inventions like this and this invention will be visible in a product or be published?

The invention is very visible to our customers (operators) simply because it is related to QoS control that customers are very much interested in controlling.

Is there a likely use of the invention in a Lucent product of a type that others will copy exactly?

Yes.

Is the invention a detectable semiconductor industry processing invention, structure or fundamental chip building block with at least some commercial viability?

The QCL can be implemented in software or hardware by IP vendors and its delectability will depend on exposure of the registers that control the thresholds (other registers) in ASIC devices datasheets. Even though if registers like this are exposed the exact algorithm may be different that the one presented by this invention.

Submitted by:

Name: \_\_\_\_\_  
Location: \_\_\_\_\_ Telephone Number \_\_\_\_\_  
Department No.: \_\_\_\_\_  
Name of Director/Dept. Head: \_\_\_\_\_  
BU: \_\_\_\_\_  
Date: \_\_\_\_\_